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**SCIENCE OF NUMBER IN
PLATO'S *PARMENIDES***

Luc Brisson

An interpretation of Plato's *Parmenides* must address these three questions:

1. What weight should be lent to the staging around Parmenides and Zeno?
1. How should the critique of Forms, in Part I be interpreted? [T1, T2]
1. How do the two parts of the dialogue relate to each other? [T1-T2: T3]

Parmenides, b7

...hold your thought back from this route of inquiry
and do not let habit, rich in experience, compel
you along this route to direct an aimless eye
and an echoing ear and tongue
but judge by reasoning (*logos*) the much
contested examination spoken by me.

Tr. Richard McKirahan

Parmenides, b8

Just one story of a route
is still left: that it is.

On this there are signs
very many, that what –is
is ungenerated and imperishable,
a whole of a single kind,
unshaken, and complete...

Tr. Richard McKirahan

Parmenides, b8

From what-is-not

I will allow you neither to say nor to think:

For it is not to be said or thought that it is not.

Tr. Richard McKirahan

Zeno's work is a defense of Parmenides's monism

Árpád Szabó on Zeno

According to Simplicius, Zeno was engaged in contrasting one *hypothesis* with another:

- ⊙ ἡ ὑπόθεσις ἡ λέγουσα πολλά ἔστιν
'the *hypothesis* which states that what exists is *many*' with
- ⊙ ἡ τοῦ ἓν εἶναι 'the *hypothesis* 'which states that what exists is *one*.'

Mathematics and Dialectic

- ⦿ Dialectic came before mathematics (Szabó)
- ⦿ Aristotle claims that Zeno invented the method.
- ⦿ Dialectic is a *debate*.
 - αἴτημα | *aitēma* (a ‘request’ or ‘demand’) synonyms:
 - ὑπόθεσις | *hypothesis*
 - ὑποκείμενον | *hypokeimenon*

But it is a debate about definitions

Mathematics and Dialectic

- ◎ Szabó (1978, p. 269):

A joint investigation could not be based on an assumption or *hypothesis* unless *both* participants agreed to it. Hence one of them had to *ask* for the agreement of the other. An agreed definition could be called *homologēma* or *hypothesis*.

Ex: *Meno* 86e3; *Theaetetus*; *Parmenides*

This explains the format for Part II of the *Parmenides*, but what about the objects?

Let's go back to the pebbles.

Mathematics and Dialectic

- ◎ *Mathē/mathēmata*

- Μάθημα “learning matter”
- Μάθησις “study, discipline”

- ◎ Μαθηματικά “mathematical objects”

Before the theoretical, there was the practical

Proclus

- ‘Keeping count’ started with the Phoenicians for bookkeeping grain stores.
- Geometry “land measure” began with the Egyptians to measure the land to levy taxes against it.

Ancient Greek Mathematical Concepts

⦿ even/odd

- *Artios*: that which can be divided into two
- *Perittos*: the one left over

⦿ *arithmos/monas*

- ἀριθμός : a limited multitude
- μονάς : “unit”, the least definite thing “of all possible partitions” (Klein 1967:42)

Szabó on Form or *Eidos*

- ⦿ The Greek word for ‘to define’ (*ὀρίζεσθαι*) ... means to *mark off*.
- ⦿ A definition was intended to mark off the Form or *Eidos* of an object from that which it *was not* and in this way secure the consistency of the Form in question.

Plato's *Parmenides*, Part II

- ⦿ Deductions are a dialectical exercise
 - Starting with contrary hypotheses of The One
- ⦿ The One is the subject of every deduction
- ⦿ The One is a Form, but does not stand for every Form
- ⦿ The 'exercise' helps determine what can be said of the One and its instantiations

Plato's *Parmenides*, Part II

- ⦿ Since the One *is*
- ⦿ And everything participates in the One
- ⦿ It follows that
- ⦿ If an object participates in the One and another Form, then the object is an *arithmos*.

So what does this tell us?

Plato's *Parmenides*, Part II

- ⦿ The deductions tell us how the world is affected by a single form, the One.
- ⦿ We learn a general account of the Form-particular relation.
- ⦿ This account is not different from the account we first received from Plato in the *Phaedo*. [T1 : T4]

Conclusion

- The theory of forms is a precursor to ancient Greek mathematics, founded upon an Eleatic account of Being.
- To understand the Form-particular relation, one must understand the Greek concept of *arithmos* and its properties.

Conclusion

- ⦿ A Form defines the characteristic of objects by providing a limit/boundary to the objects.
 - To understand a Form is to understand it as a unity. (Parmenides B8; Plato's *Phaedo* 78d-e, Symposium 211a-d)
- ⦿ Objects are given their characteristics by their participating in Forms.
 - To understand a plurality is to understand it as an *arithmos*, 'number'
- ⦿ This is the 'science of number' in the Plato's *Parmenides*.

Thank you!

References

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